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PRESENT STATUS OF MANGO CULTIVATION IN BANGLADESH: CASE OF SHIBGONJ UPAZILA OF CHAPAINAWABGONJ DISTRICT

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ABSTRACT

The primary purpose of the study was to identify the present status of mango cultivation and to determine the problems faced by the farmers in mango cultivation in Bangladesh. Status of mango cultivation was measured by area under mango cultivation, number of mango plants, number of mango varieties, disease and insect infestation of plants, uses of chemicals and fruit yield. Among the 101 respondents, 97 respondents cited that they cultivate Fazli variety followed by Khirshapat, Langra, Guti, so on. 92 respondents used pesticides followed by other chemicals, and 54 respondents used cow dung as organic supplies. Among the respondents, 62 respondents cited that mango hoppers are devastating for mango cultivation and 75 respondents cited that Anthracnose causes at a greater extent in mango plants. It was revealed that the majority (81.7%) of the respondents faced medium level problems followed by 12.3% faced low, and only 6% faced high problems during mango cultivation for commercial purpose. Computed co-efficient of correlation shows that educational level, family size, farm size, organizational participation, extension media contact, cosmopolitanism and training experience are significantly related with the status of mango cultivation.

1. Introduction

Mango (Mangifera indica L.) is one of the most common and popular fruit and often mentioned as the 'King of fruits' (Purseglove, 1972) due to its excellent flavor, attractive color, delicious taste and high nutritive value. Mango is a tropical, and subtropical fruit belongs to the family Anacardiaceae, which was originated in South-Asia-Malayan. Records suggested that it has been cultivated for more than 4000 years (D. Candolle, 1984).

In Bangladesh, it occupies an area of 37,830 hectares of land with an annual production of 116,1685 metric ton (MT) (BBS, 2016). Mango grows in almost all of Bangladesh but commercial and good quality mangoes grown in the North-Western districts of the country. The leading mango growing districts of the country are Rajshahi, Chapainawabgonj and greater Dinajpur. Mango is seasonal cash crop of North-Western region of Bangladesh which dominates the economy of Rajshahi and Chapainawabgonj district. More than 500 varieties of sweet edible mangoes can be found in Rajshahi and Chapainawabgonj district. It is estimated that around 85% people of the mentioned districts are directly or indirectly dependent on mango cultivation and business (Dhaka Tribune, 2018a).

Chapainawabgonj is called the capital of the mango in Bangladesh. In the summer, mango businesses

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lead the economy of this district. Most of the farmlands of this district are full of mango orchards where various kinds of mango are producing by farmers. Chapainawabgonj alone produces almost 152,285 MT of mangoes on 44,430 hectares of land (BBS, 2015). The main parts of the mango production area are Shibgonj, Bholahat and Gomastapur *upazilla* (sub-district).

Mango production provides more income to the farmers than any other crops. Mango production of the areas now on danger by different constraints like a high rate of pesticides, fertilizers, lack of fruit processing and preserving system, marketing facilities. There are ample scopes for expansion of mango cultivation in Bangladesh if we can be aware about these problems. Therefore, the specific objectives of the study were to: i) assess the present status of mango cultivation in the study areas ii) analysis the socio-economic characteristics of the farmers those are related to mango cultivation ii) explore the relationship between the status of mango cultivation and socioeconomic characteristics of farmers.

2. Methodologies

For this study, data was collected during March to April 2017 to investigate the present situation of mango cultivation in Shibgonj *upazilla* of Chapainawabgonj district. The study was confined to purposively ten selected villages namely Chattrajitpur, Kalupur, Kazipara, Tottipur, Kanshat, Shibnagor, Atroshia, Bisshanathpur, Chowka and Ghorial from four unions (lowest administrative unit in Bangladesh). To get information as per objectives, a total number of 101 respondents were selected randomly out of 650 mango growers of the selected areas. A structured interview schedule was carefully prepared in Bengali, keeping the objectives of the study in view. The schedule was pre-tested before final collection of data. After pre-test, necessary correction, addition, reduction and rearrangement were made. The interview schedule was then multiplied in its final form for data collection.

The personal and socio-economic characters of the respondents were age, educational level, family size, farm size, annual income, organizational participation, extension media contact, cosmopolitanism, knowledge on mango cultivation and training experience. Appropriate scalings were used for measuring socio-economic characters in mango cultivation (table 1). Data were also collected on the area of mango cultivation, types of mango varieties, number of mango plants, diseases and insect infestation, uses of chemicals and yield of mango to determine the present status of mango cultivation. Also, problem confronted by farmers in mango cultivation was also measured.

2.1 Measurement of the status of mango cultivation

Respondents were given their answer for +1 value for increase their status (areas under mango cultivation) or -1 value for decrease their status and, 0 value for unchanged their status in mango cultivation comparing with last three years. The collected data were coded, compiled, tabulated and analyzed. The local units were converted into standard units.

2.2 Measurement of problems confrontation for mango cultivation

Problem confrontation was measured using closed form of the question, and the farmers were asked to give their opinion on 15 selected problems in connection with mango cultivation. The selected problems were identified based on five focus group discussions (FGDs) with the farmers of the selected areas. The farmer gave their response as ‘severe’, ‘moderate’, ‘slightly’ and ‘not at all’ and the scores assigned to these responses were 3, 2, 1, and 0 respectively for each problem included in regarding of mango cultivation. The problems were ranked by the value of Problem Confrontation

Index (PCI) as calculated by using the following formula:

$PCI = P_n \times 0 + P_{sl} \times 1 + P_m \times 2 + P_{se} \times 3$ ……(i)

Where P_n= Frequency of the farmers had not at all problem, P_{sl}= Frequency of the farmers had slightly problem, P_m=Frequency of the farmers had a moderate problem, P_{se}= Frequency of the farmers had a severe problem

3. Result and Discussion

3.1 Selected characteristics of the mango farmers (independent variables)

The salient features of the selected socio-economic characteristics of mango farmers are shown in table 1. Table 1 shows that the highest numbers of the mango farmers (64.2%) in the study area were in middle-aged followed by the young aged (18.9%) and only 16.9% were under the old aged category. Highest portion of the respondent (34.7%) had achieved higher secondary education followed by graduate (26.9%), the lowest number of the respondent (2%) were primary passed and shocking information was that about 22.8% of mango farmers were illiterate. It was found that most of the respondents (52.5%) had small family size followed by medium family size with 39.6% of respondents. Only 8% of the respondents had a large family size. The highest proportion (48.89%) of the respondents had medium-sized farm while 31.69% of respondents had a small farm and 19.42% had a large farm in the study area. No landless (<0.02 ha) mango farmers were found. Most (47.9%) of the respondents were in the medium income categories followed by high income (22.7%) and very high income (18.9%), while only about 10.5% belongs to low-income categories. The majority (59.4%) of the respondents had low participation. However, 23.8% of the respondents had no participation, and only 16.8% had medium participation in different organizations. Most of the respondents (61.5%) had low contact followed by 30.5% medium contact, and only 8% had high media contact. It indicated that the respondents of these areas had shallow communication to extension media. The majority (73.3%) of the respondents had medium cosmopolitanism as compared to 15.9% had low cosmopolitanisms, and only 10.8% had high cosmopolitanisms. Most of the respondents (62.4%) had medium knowledge in mango cultivation compared to 28.7% had high knowledge and only 8.9% had low knowledge in mango cultivation. The highest percentage (67.8%) of the respondents had no training experience compared to 26.8% had low training experience, and only 6% had medium training experience while farmers of the study areas had no high training experience.

Around 22 per cent of the respondents are illiterate because in Bangladesh farming is regarded as the business of illiterate (Pervez, 2018). Most of the respondents had medium-sized farm size. This is because mango farmers were more prosperous than other farmers in this areas and the average land size of the mango farmers were higher than the national average (Alam et al. 2017). Similarly, the average income is also higher than the national average. Therefore, rice farmers are becoming mango farmers in many districts in Bangladesh (Dhaka Tribune (2018b). As the respondents had higher farm size and income, they had a high cosmopolitism.

3.2 Present status of mango cultivation

The findings of the study showed that following information about the present status of mango cultivation based on the individual score of six statements shown in table 2. 62 respondents increased their mango cultivating area by converting their agricultural land, while 31 respondents decrease and only eight respondents had no change in their mango growing area. 57 respondents replied as they increased their mango plants by planting new followed by cutting old trees or died trees as well as filling gaps in their garden. It was observed that 97 respondents have *Fazli* mango in their garden

followed by *Khirshapat* (92), *Langra* (82), *Guti* (90), *Arshina* (75), *Lakhnaw* (72), *Himsager* (67), *Rani Prochonno* (22), *Shindwri* (21), *Gopalvog* (15), *Kuyapahari* (10) and *Varoti* (5). Only 32 respondents reported that they increase their mango varieties and majority (37.6%) of the respondent's replied as they had no change in mango varieties and 30.7% respondents indicated that some of the old varieties were vanished day by day due to increase diseases and insect infestation and climate change. Among the 101 respondents 62 respondents cited that their mango plants were incited frequently by mango hoppers followed by mango fruit weevil (34), stem borer (25), and mealy bug (17) and 75 respondent cited that their mango plants and fruits were infected frequently by anthracnose, followed by sooty mould (42), powdery mildew (15) and leaf blight (12). Most of the respondents (62) reported that increase diseases and insects attack in their mango garden and few of them said due to use of heavy pesticides decreased their attack in their garden.

Table 1. Salient features of the selected characteristics of the mango farmers in Shibgonj *Upazilla*

Selected Character	Scoring system	Range		Respondents			Mean	SD
		Possible	Observed					
				Categories	Frequency	%		
Age	Year	-	22-65	Young (up to 35)	19	18.9		
				Middle age (36-55)	65	64.2	46.07	10.93
				Old age (above 55)	17	16.9		
Educational level	Year of schooling	-	0-18	Illiterate (0)	23	22.8		
				Primary (1-5)	2	2.0		
				Secondary (6-10)	17	16.8	9.79	5.86
				Higher Secondary (11-12)	35	34.7		
				Graduate (>12)	24	23.9		
Family size	number	-	3-8	Small (≤ 4)	53	52.5		
				Medium (5-6)	40	39.6	4.69	1.2
				Large (> 6)	8	8.0		
Farm size	Hectare	-	0.12-14.74	Small (upto 1.0 ha)	32	31.59		
				Medium (1.04-3.0 ha)	49	48.89	2.01	2.02
				Large (> 3.0 ha)	20	19.42		
Annual income	Taka (000)	-	62-6000	Low(≤ 100)	11	10.5		
				Medium (101-250)	48	47.9	326.32	602.5
				High (251-400)	23	22.7		
				Very high (>400)	19	18.9		
Organizational participation	Scale score	-	0-4	No participation (0)	24	23.8		
				Low participation (1-2)	60	59.4	1.56	1.16
				Medium participation (3-4)	17	16.8		
				High Participation (>4)	0	00		
Extension media contact	Scale score	0-30	3-22	Low (up to 10)	62	61.5		
				Medium (11-15)	31	30.5	10.07	3.22
				High (>15)	8	8.0		
Cosmopolitanisms	Scale score	0-24	6-20	Low (up to 10)	16	15.9		
				Medium (11-15)	74	73.3	12.64	2.60
				High (above > 15)	11	10.8		

Selected Character	Scoring system	Range		Respondents			Mean	SD
		Possible	Observed	Categories	Frequency	%		
Knowledge on mango cultivation	Scale score	0-20	15-20	Low knowledge (0)	9	8.9	17.51	1.67
				Medium (16-18)	63	62.4		
				High(19-20)	29	28.7		
Training experience	Scale score	-	0-5	No training (0)	68	67.3	0.53	1.01
				Low (1-2)	27	26.47		
				Medium (3-5)	6	6.0		
				High (>5)	00	00		

Among the 101 respondents, 88 respondents cited that they used chemical fertilizer (Uses, TSP, MP, gypsum) and 54 respondents used organic fertilizers (cow dung) in their orchards. Most of the respondents (67) reported that they increased used of different chemicals like, synthetic fertilizers and pesticides for more fruiting and uses hormones for early or late ripening of mango fruits. 66 respondents reported that they increased their yield due to using different chemicals and 33 respondents replies as decreased their yield day by day due to varying factors like diseases and insect attack, low fruiting in old trees, natural calamities and so on.

Table 2 . Present status of mango cultivation by the mango farmers

Issues	Present status of mango cultivation					
	Increased (+1)		Decreased (-1)		No change (0)	
	Frequency	%	Frequency	%	Frequency	%
Area under mango cultivation	62	61.4	31	30.7	8	7.9
Number of mango plants.	57	56.4	29	28.47	15	14.69
Number of mango varieties	32	31.7	31	30.7	38	37.6
Disease and insects infestation	62	61.4	36	35.6	3	3.0
Uses of chemicals	67	66.3	34	33.7	0	0
Yield	66	65.3	33	32.7	2	2.0

Based on the individual score of six statements, a total score was prepared by summation of scores of all personal statements mentioned by the respondents regarding their present status of mango cultivation. The total score was range from (-) 6 to (+) 6 and mean was 1.50 with a standard deviation of 1.83 as shown in table 3. According to the present conditions of the mango farmers score, they were classified in to three categories as increase (+ve values), decrease (-ve values) and no change (0 value) that are shown in table-3. Majority of farmers (63.3%) had increased their status in mango cultivation whereas 34.7% had decreased and only 2% had no change in their mango cultivation.

Table 3. Distribution of the mango farmers based on the present status of mango cultivation

Status	Frequency	Percentage	Mean	SD
Increased (+ve)	64	63.3	1.50	1.83
Decreased (-ve)	35	34.7		
No change (0)	2	2.0		
Total	101	100		

3.3 Relationship between the selected characteristic of the mango farmers and present status of mango cultivation

The findings of the study revealed that educational level, family size, farm size, organizational participation, extension media contact, cosmopolitanisms and training experience had a positive and significant relationship with their present status of mango cultivation. On the other hand, age, annual income and knowledge on mango cultivation had no significant relationship with the same regard (table 4). As educated people know the latest technologies related to mango cultivation, thus they could increase the mango cultivation status. Similarly, the farmers had more farm size, could improve the state of mango cultivation. The farmers who had more organizational participation, media contact and cosmopolitanism and training get the latest knowledge of mango cultivation and business. Therefore these farmers could increase their mango cultivation. Ajunwa et al. (2016) found organizational participation rise the status of the cassava cultivation in Nigeria. Pervez et al. (2015) found cosmopolitanism and organizational participation increased the farmers' knowledge and confidence in farming.

3.4 Problems faced by the farmers during mango cultivation

The respondents gave their opinion about the different problems faced by them. Farmers gave their responses for selected 15 issues based on their extent of the problem faced in mango cultivation. Furthermore, problems were ranked according to the result (table 5). The study revealed that the main problem of mango cultivation is the high price of pesticides or insecticides. Among 15 problems, lack of fruit processing industry, lack of fruit preservation facilities and lack of marketing facilities ranked as 2nd, 3rd and 4th top problems, respectively. The high price of fertilizers and disease and infestation both was ranked as 5th position according to their seriousness. Due to some reason dropping of flowers and fruits and lack of transport and communication system also perceived as a noticeable problem in the study area.

Table 4. Correlation co-efficient between selected characteristics of farmers and present status of mango cultivation

Dependent variable	Independent variables	Computed 'r' values (n = 101)
Present status of mango cultivation	Age	0.081^{NS}
	Educational level	0.629**
	Family size	0.199*
	Farm size	0.357**
	Annual income	0.160^{NS}
	Organizational participation	0.245*
	Extension media contact	0.436**
	Cosmopolitanisms	0.282**
	Knowledge on mango cultivation	0.042^{NS}
	Training experience	0.267**

*Significant at 5% level **Significant at 1% level

The score of problems faced by the farmers ranged from 18 to 37 mean was 25.58, and the standard deviation was 3.27. According to their responses score, the respondents were classified into three categories namely low, medium and high problems categories. The distribution appears in table -6. It was revealed that the majority (81.7%) of the respondents faced medium problem followed by 12.3% encountered low problem and only 6% met high problem during mango cultivation to commercial scale. Among the issues, the most significant issue in mango cultivation is the high price of

insecticides/ pesticides to the farmers. Others researchers like Sabur (1999); Sabur and Molla (2001), Rahman (2002); Pervez et al. (2018) also found similar findings in Bangladesh. The second most significant problem in mango cultivation is lack of fruit processing industry. In Bangladesh, others works also found similar conclusions (e.g. The Independent (2016); Katalyst (2016); (Khan, 2014) etc.)

Table 5. Problems faced by the mango farmers

SL. No.	Problems	Nature of problems					
		Severe	Moderate	Slightly	Not at all	Total	Rank
1.	Inadequate supply of better seedling/ graft	1	3	48	49	57	13th
2.	High price of planting materials	3	23	58	17	113	12th
3.	High price of fertilizers	26	44	31	0	197	5th
4.	High price of pesticides /insecticides	81	19	1	0	282	1st
5.	Disease and insect infestation	20	56	25	0	197	5th
6.	Low fruiting in aged trees	3	56	40	2	161	8th
7.	Alternate bearing	1	47	53	0	150	10th
8.	Dropping of flowers and fruit	15	64	19	3	192	6th
9.	Thief problem	0	1	33	67	35	14th
10.	Low market price	0	52	48	1	152	9th
11.	Natural calamities	4	31	44	22	118	11th
12.	Lack of transport and communication system	11	70	10	10	183	7th
13.	Lack of fruit preservation	41	53	7	0	236	3rd
14.	Lack of marketing facilities	44	47	9	1	235	4th
15.	Lack of fruit processing industry	74	27	0	0	276	2nd

Table 6. Distribution of respondents according to the problems faced by them

Categories	Frequency	Percentage	Mean	SD
Low problems (up to 20)	13	12.3	25.58	3.27
Medium problem (21-30)	82	81.7		
High problem (above 30)	6	6.0		
Total	101	100		

4. Conclusions and Recommendations

The findings indicated that respondents of the study area had a satisfactory level of attitude towards the increase of their present situation compared with the previous three years. Majority of the respondent used chemicals like synthetic fertilizers for more production, control disease and insect infestation and other hormones after harvesting. The main problems found in the study area in case of mango cultivation practices were the high price of pesticides, lack of fruit processing industry, lack of fruit preservation, lack of marketing facilities, diseases and insects infestation, the high amount of fertilizers and so on. Based on the findings and results, the following recommendations may be proposed for maintaining the best production and marketing of mango: a) Marketing of mango is an crucial aspect. Therefore, efficient production technique helps to increase the volume of output and concerned authorities should take into active consideration about the local and international market for it. b) The government must have policies to generate activates in the study area during adverse

condition providing technical support like credit facilities, proper marketing facilities, fruit processing industry with the help of GO and NGO farm and to increase their mango faming status.

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